

- 20 -

Claims

1. A method for supporting of plurality of chip rates
in a code division multiple access (CDMA) system, the
5 method comprising:
transmitting signals in the system in a frame
having a plurality of timeslots;
operating at least a first one of the plurality
of timeslots in the frame at a first one of the
10 plurality of chip rates; and
operating at least a second one of the
plurality of timeslots in the frame at a second one
of the plurality of chip rates.
- 15 2. The method of claim 1 wherein the system comprises a
3GPP UMTS system.
3. The method of claim 2 wherein the 3GPP UMTS system
comprises a TDD system.
- 20 4. The method of claim 1, 2 or 3 wherein the plurality
of chip rates are integer multiples of 3.84Mcps.
5. The method of claim 4 wherein the first one of the
25 plurality of chip rates is substantially 3.84Mcps and the
second one of the plurality of chip rates is
substantially 7.68Mcps.
6. The method of any one of claims 1-5 wherein the
30 frame comprises beacon data in at least one of the
plurality of timeslots.

- 21 -

7. The method of any one of claims 1-6 wherein the beacon data is in one of the plurality of timeslots operating at the lowest of the plurality of chip rates.
- 5
8. The method of any one of claims 1-5 wherein the frame comprises first beacon data in one of the plurality of timeslots operating at the first one of the plurality of chip rates and second beacon data in another of the
- 10 plurality of timeslots operating at the second one of the plurality of chip rates.
9. The method of any one of claims 1-8 wherein the first and second of the plurality of chip rates are
- 15 controlled independently of each other.
10. The method of any one of claims 1-8 wherein the first and second of the plurality of chip rates are commonly controlled.
- 20
11. The method of any one of claims 1-10 wherein the method comprises transmitting a plurality of instantiations of the at least a first one of the plurality of timeslots in the frame operating at the
- 25 first chip rate.
12. The method of claim 11 wherein the plurality of instantiations are separated in the frequency domain.
- 30 13. The method of claim 11 or 12 wherein the number of the plurality of instantiations is proportional to the

- 22 -

ratio of the bandwidth of the second chip rate system to the bandwidth of the first chip rate system.

14. The method of any one of claims 1-13 wherein the
5 first chip rate system operates at substantially the same carrier frequency as the second chip rate system.

15. The method of any one of claims 1-14 wherein the method further comprises transmitting to a user
10 parameters of timeslots via broadcast signalling.

16. The method of claim 15 wherein the system is a UMTS TDD system, and the step of transmitting to a user parameters of timeslots comprises transmitting signals
15 broadcast in system information blocks.

17. The method of any one of claims 1-14 wherein the method further comprises transmitting to a user parameters of timeslots via point to point signalling.
20

18. The method of claim 17 wherein the point to point signalling defines the timeslot parameters for a single allocation.

25 19. The method of claim 17 wherein the point to point signalling defines the timeslot parameters for a multiplicity of allocations.

20. The method of claim 17 wherein the system comprises
30 a UMTS TDD system, and the point to point signalling is carried in radio resource control (RRC) messages.

- 23 -

21. The method of claim 17 wherein the system comprises a UMTS TDD system, and the point to point signalling is carried in medium access control (MAC) messages.
- 5 22. The method of claim 17 wherein the system comprises a UMTS TDD system, and the point to point signalling is carried in physical layer messages.
- 10 23. The method of any one of claims 1-22 wherein user equipment receiving the transmitted frame autonomously determines the chip rate applied in a timeslot.

- 24 -

24. A code division multiple access (CDMA) system for supporting a plurality of chip rates, the system comprising:

5 means for transmitting signals from a network to user equipment in the system in a frame having a plurality of timeslots;

means for operating at least a first one of the plurality of timeslots in the frame at a first one of the plurality of chip rates; and

10 means for operating at least a second one of the plurality of timeslots in the frame at a second one of the plurality of chip rates.

25. The CDMA system of claim 24 wherein the system
15 comprises a 3GPP UMTS system.

26. The CDMA system of claim 25 wherein the 3GPP UMTS system comprises a TDD system.

20 27. The CDMA system of claim 24, 25 or 26 wherein the plurality of chip rates are integer multiples of substantially 3.84Mcps.

28. The CDMA system of claim 27 wherein the first one of
25 the plurality of chip rates is substantially 3.84Mcps and the second one of the plurality of chip rates is substantially 7.68Mcps.

29. The CDMA system of any one of claims 24-28 wherein
30 the frame comprises beacon data in at least one of the plurality of timeslots.

- 25 -

30. The CDMA system of any one of claims 24-29 wherein the beacon data is in one of the plurality of timeslots operating at the lowest of the plurality of chip rates.

5

31. The CDMA system of any one of claims 24-28 wherein the frame comprises first beacon data in one of the plurality of timeslots operating at the first one of the plurality of chip rates and second beacon data in another
10 of the plurality of timeslots operating at the second one of the plurality of chip rates.

32. The CDMA system of any one of claims 24-31 wherein the first and second of the plurality of chip rates are
15 controlled independently of each other.

33. The CDMA system of any one of claims 24-31 wherein the first and second of the plurality of chip rates are commonly controlled.

20

34. The CDMA system of any one of claims 24-33 wherein the means for transmitting signals from a network to user equipment in the system comprises means for transmitting a plurality of instantiations of the at least a first one
25 of the plurality of timeslots in the frame operating at the first chip rate.

35. The CDMA system of claim 34 wherein the plurality of instantiations are separated in the frequency domain.

30

- 26 -

36. The CDMA system of claim 34 or 35 wherein the number of the plurality of instantiations is proportional to the ratio of the bandwidth of the second chip rate system to the bandwidth of the first chip rate system.

5

37. The CDMA system of any one of claims 24-36 wherein the first chip rate system operates at substantially the same carrier frequency as the second chip rate system.

10 38. The CDMA system of any one of claims 24-37 wherein the system further comprises means for transmitting to the user parameters of timeslots via broadcast signalling.

15 39. The CDMA system of claim 38 wherein the system is a UMTS TDD system, and the means for transmitting to the user parameters of timeslots comprises means for transmitting signals broadcast in system information blocks.

20

40. The CDMA system of any one of claims 24-37 wherein the system further comprises means for transmitting to the user parameters of timeslots via point to point signalling.

25

41. The CDMA system of claim 40 wherein the point to point signalling defines the timeslot parameters for a single allocation.

- 27 -

42. The CDMA system of claim 40 wherein the point to point signalling defines the timeslot parameters for a multiplicity of allocations.
- 5 43. The CDMA system of claim 40 wherein the system comprises a UMTS TDD system, and the point to point signalling is carried in radio resource control (RRC) messages.
- 10 44. The CDMA system of claim 40 wherein the system comprises a UMTS TDD system, and the point to point signalling is carried in medium access control (MAC) messages.
- 15 45. The CDMA system of claim 40 wherein the system comprises a UMTS TDD system, and the point to point signalling is carried in physical layer messages.
46. The CDMA system of any one of claims 24-45 wherein
20 the user equipment is adapted to autonomously determine the chip rate applied in a timeslot.

- 28 -

47. A base station for use in a code division multiple access (CDMA) system supporting a plurality of chip rates, the base station comprising:

5 means for transmitting signals from the base station to user equipment in the system in a frame having a plurality of timeslots;

means for operating at least a first one of the plurality of timeslots in the frame at a first one of the plurality of chip rates; and

10 means for operating at least a second one of the plurality of timeslots in the frame at a second one of the plurality of chip rates.

48. The base station of claim 47 wherein the system
15 comprises a 3GPP UMTS system.

49. The base station of claim 48 wherein the 3GPP UMTS system comprises a TDD system.

20 50. The base station of claim 47, 48 or 49 wherein the plurality of chip rates are integer multiples of substantially 3.84Mcps.

51. The base station of claim 50 wherein the first one
25 of the plurality of chip rates is substantially 3.84Mcps and the second one of the plurality of chip rates is substantially 7.68Mcps.

52. The base station of any one of claims 47-51 wherein
30 the frame comprises beacon data in at least one of the plurality of timeslots.

- 29 -

53. The base station of any one of claims 47-52 wherein the beacon data is in one of the plurality of timeslots operating at the lowest of the plurality of chip rates.

5

54. The base station of any one of claims 47-51 wherein the frame comprises first beacon data in one of the plurality of timeslots operating at the first one of the plurality of chip rates and second beacon data in another
10 of the plurality of timeslots operating at the second one of the plurality of chip rates.

55. The base station of any one of claims 47-54 wherein the first and second of the plurality of chip rates are
15 controlled independently of each other.

56. The base station of any one of claims 47-54 wherein networks of the first and second of the plurality of chip rates are commonly controlled.

20

57. The base station of any one of claims 47-56 wherein the means for transmitting signals from the base station to user equipment in the system comprises means for transmitting a plurality of instantiations of the at
25 least a first one of the plurality of timeslots in the frame operating at the first chip rate.

58. The base station of claim 57 wherein the plurality of instantiations are separated in the frequency domain.

30

- 30 -

59. The base station of claim 57 or 58 wherein the number of the plurality of instantiations is proportional to the ratio of the bandwidth of the second chip rate system to the bandwidth of the first chip rate system.
- 5 60. The base station of any one of claims 47-59 wherein the first chip rate system operates at substantially the same carrier frequency as the second chip rate system.
- 10 61. The base station of any one of claims 47-60 wherein the base station further comprises means for transmitting to the user parameters of timeslots via broadcast signalling.
- 15 62. The base station of claim 61 wherein the system is a UMTS TDD system, and the means for transmitting to the user parameters of timeslots comprises means for transmitting signals broadcast in system information blocks.
- 20 63. The base station of any one of claims 47-60 wherein the base station further comprises means for transmitting to the user parameters of timeslots via point to point signalling.
- 25 64. The base station of claim 63 wherein the point to point signalling defines the timeslot parameters for a single allocation.

- 31 -

65. The base station of claim 63 wherein the point to point signalling defines the timeslot parameters for a multiplicity of allocations.
- 5 66. The base station of claim 63 wherein the system comprises a UMTS TDD system, and the point to point signalling is carried in radio resource control (RRC) messages.
- 10 67. The base station of claim 63 wherein the system comprises a UMTS TDD system, and the point to point signalling is carried in medium access control (MAC) messages.
- 15 68. The base station of claim 63 wherein the system comprises a UMTS TDD system, and the point to point signalling is carried in physical layer messages.

- 32 -

69. User equipment for use in a CDMA system supporting a plurality of chip rates, the user equipment comprising:

means for receiving signals from a base station in a frame having a plurality of timeslots, at least a first one of the plurality of timeslots in the frame being operated at a first one of the plurality of chip rates, and at least a second one of the plurality of timeslots in the frame being operated at a second one of the plurality of chip rates.

70. The user equipment of claim 69, further comprising:

means for detecting in the received frame predetermined information in one of the plurality of timeslots at the first one of the plurality of chip rates; and

means for transmitting a signal to the base station indicating that the user equipment is able to operate at the second one of the plurality of chip rates.

71. The user equipment of claim 70, wherein the means for transmitting a signal to the base station comprises means for transmitting a signal to the base station indicating that the user equipment is able to operate at both the first one of the plurality of chip rates and the second one of the plurality of chip rates.

72. The user equipment of claim 69, 70 or 71 wherein the system comprises a 3GPP UMTS system.

- 33 -

73. The user equipment of claim 72 wherein the 3GPP UMTS system comprises a TDD system.

74. The user equipment any one of claims 69-73 wherein
5 the plurality of chip rates are integer multiples of substantially 3.84Mcps.

75. The user equipment of claim 74 wherein the first one
of the plurality of chip rates is substantially 3.84Mcps
10 and the second one of the plurality of chip rates is substantially 7.68Mcps.

76. The user equipment of any one of claims 70-74
wherein the predetermined information comprises beacon
15 data.

77. The user equipment of claim 75 wherein the beacon
data is in one of the plurality of timeslots operating at
the lowest of the plurality of chip rates.
20

78. The user equipment of any one of claims 69-77
wherein networks of the first and second of the plurality
of chip rates are controlled independently of each other.

79. The user equipment of any one of claims 69-77
wherein networks of the first and second of the plurality
of chip rates are commonly controlled.
25

80. The user equipment of any one of claims 69-79
30 wherein the user equipment is adapted to receive in the

- 34 -

same frame the timeslots at a higher chip rate and the timeslots at a lower chip rate.

81. The user equipment of any one of claims 69-80
5 wherein the first chip rate system operates at substantially the same carrier frequency as the second chip rate system.

82. The user equipment of any one of claims 69-81
10 further comprising means for receiving from the base station parameters of timeslots via broadcast signalling.

83. The user equipment of claim 82 wherein the system is a UMTS TDD system, and the means for receiving from the
15 base station parameters of timeslots comprises means for receiving signals broadcast in system information blocks.

84. The user equipment of any one of claims 69-82 further comprising means for receiving from the base
20 station parameters of timeslots via point to point signalling.

85. The user equipment of claim 84 wherein the point to point signalling defines the timeslot parameters for a
25 single allocation.

86. The user equipment of claim 84 wherein the point to point signalling defines the timeslot parameters for a multiplicity of allocations.

30

- 35 -

87. The user equipment of claim 84 wherein the system comprises a UMTS TDD system, and the point to point signalling is carried in radio resource control (RRC) messages.

5

88. The user equipment of claim 84 wherein the system comprises a UMTS TDD system, and the point to point signalling is carried in medium access control (MAC) messages.

10

89. The user equipment of claim 84 wherein the system comprises a UMTS TDD system, and the point to point signalling is carried in physical layer messages.

15

90. The user equipment of any one of claims 69-89 wherein the user equipment is adapted to autonomously determine the chip rate applied in a timeslot.

20

91. A computer program element comprising computer program means for performing substantially the method of any one of claims 1-23.

25

92. An integrated circuit comprising substantially the means for transmitting signals, the means for operating at least a first one of the plurality of timeslots, and the means for operating at least a second one of the plurality of timeslots in the base station of any one of claims 47-23, or comprising substantially the means for receiving signals in the user equipment of any one of

30

claims 69-90.